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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/602,503	02/20/96	BALL M	271GUS

D1M1/0709

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EXAMINER	
TURNER,K	

ART UNIT	PAPER NUMBER
1107	#8

DATE MAILED: 07/09/97

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
08/602,503	Ball
Examiner	**Group Art Unit**
Kevin F. Turner	1107

☒ Responsive to communication(s) filed on *Apr 21, 1997* .

☒ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *19, 21-23, and 25-34* is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *19, 21-23, and 25-34* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____ .

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____ .

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). *4*

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

DETAILED ACTION

Response to Amendment

1. The amendment filed April 21, 1997 was entered only in part. The amendment to the specification at page 12, line 23, fails to specify which occurrence of "die" should be changed. In addition, the amendments to the specification at page 12, line 26, attempt to change "die" to "dice" for three occurrences of the term "die"; there are only two occurrences for which the changes were made and the third directive was not entered

Claim Rejections - 35 USC § 103

2. Claims 19, 21-23, 25-29 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kuranaga and Kuroda in view of Fogel et al.. Kuroda teaches the mounting of a chip 1, Fig. 1, onto a substrate 4 by flip chip bonding pads 4-1. A second chip 2 is bonded to the first chip in a back to back fashion using a bonding agent 1-1. Bonding wires 2-2 connect the second chip to the substrate. Kuranaga teaches, similarly, back to back semiconductor dies, 1b & 2a, Fig. 1, mounted on another chip 1a. Chip 1b is attached to the chip 1a by flip chip bonding and chip 2a is attached to chip 1a by wire bonding 4. The chip 1a can be considered another substrate attached to the stacked chip. A third chip 2b mounted on the stack chip by flip chip bonding 6. Kuranaga and Kuroda fail to teach a direct connection between the third chip and the substrate and fail to specifically illustrate discrete components.

Fogel teaches the mounting of stacked chips, 18, 28 & 85, Fig. 5, onto a modular substrate 12. The substrate and the chips are attached to by wire bonds 44a, 50 & 83. The

assembly also includes discrete components, 75, 76 & 78, attached to the chips and/or the substrate, where wire bonding occurs between these components and the substrate and chips. Therefore it would have been obvious to one of ordinary skill in the art to have constructed the stacked assembly, as taught by Kuranaga and Kuroda, using the wire bonding and use of discrete components, as taught by Fogel, because of the benefit of increased mounting efficiency by the combination of wire and flip chip bonding, as taught by Kuroda.

3. Claims 30-32 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuranaga and Kuroda in view of Fogel et al. as applied to claims 19, 21-23, 25-29 and 33 above, and further in view of Rostoker and Takiar et al.. Kuranaga and Kuroda in view of Fogel fails to teach a second base chip mounted face down on the substrate and fails to teach a stack chip bridging the two face down chips.

Rostoker teaches two face down chips attached to a substrate, Fig. 4a, and a stack chip bridging the two face down chips. Takiar teaches a face up chip bridging between two other face up chips, Fig. 9. Therefore it would have been obvious to one of ordinary skill in the art to have constructed the stacked assembly, as taught by Kuranaga and Kuroda in view of Fogel, and using multiple base chips and bridging chips, as taught by Rostoker and Takiar, because the use of multiple base chips allow for greater processing power on a circuit board and the use of bridging allows for the formation of a cooling channel {Rostoker, Col. 15, lines 11-16}.

Response to Arguments

4. Applicant's arguments filed on April 21, 1997 with respect to the claims have been considered but are moot in view of the new grounds of rejection. Applicant's arguments, some of which may be pertinent to the present rejections, have been fully considered but they are not persuasive. Applicant first asserts that the references are complete and functional in and of themselves, so that there would be no reason to combine parts of the references. In passing, it should be remarked that all U.S. patent references are complete and functional under §112. Since the motivation to combine is given in Kuroda, there is no need to use hindsight to render applicant's invention obvious.

5. Applicant further asserts that Fogel "rejects these attachment techniques for the wire bonding and stacking technique disclosed." Fogel, at Column 1, lines 35-39, discloses that the inventors believe the "invention is specific to the distinct art area of wire bonding". The inventors intended use, while important, is not controlling of the use that one of ordinary skill in the art would have found obvious, especially given the motivation of Koruda. Such a combination would have been satisfying of Fogel's larger goal of creating multichip modules for increasing chip density and improving signal propagation.

6. In response to applicant's argument that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991).

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for response to this final action is set to expire THREE MONTHS from the date of this action. In the event a first response is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for response expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Kevin Turner whose telephone number is (703) 305-2689. The examiner can normally be reached on Monday through Friday from 7:30 AM -5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling, can be reached on (703) 308-3325. The fax numbers for this group are (703)305-3599 and (703)305-3600.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0661.

John Niebling
Supervisory Primary Examiner
Art Unit 1107

Kevin F. Turner
kevin.turner@uspto.gov
July 3, 1997